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PX-260, PX-701, PX-320, PX-324, PX-313, PX-346, PX-335, PX-146, PX-157, PX-475, PX-310, PX-368, PX-387, PX-376

Product Manual

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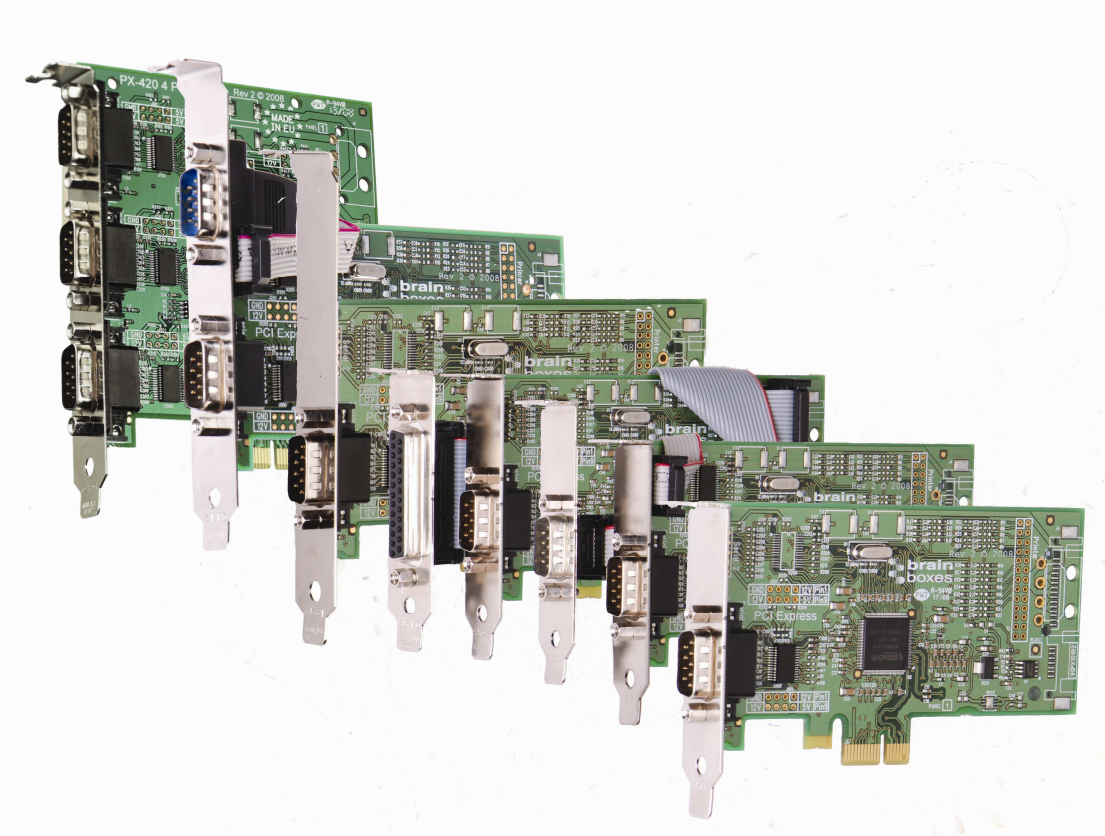
1. Introduction

1.1. The PCI Express PX- Range

The PX-Range are PCI Express (PCIe) cards providing several RS232 and RS-422/485 9-pin COM ports (see datasheets for alternatives) to any computer with a PCIe Lane. The advantage of Brainboxes PCI Express cards is that they can fit into any standard 1x, 4x, 8x or 16x PCIe Lane.

Using the PCI Express card's COM ports, all supporting 921,600 Baud, makes fast and effective communication between multiple devices simple.



1.2. Supported Operating Systems

The PCI Express PX Range can be used with the following Microsoft Operating Systems with the supplied Boost.PCIe drivers;

- Windows Server 2008 R2
- Windows 7 32-bit
- Windows 7 64-bit
- Windows Server 2008 32-bit
- Windows Server 2008 64-bit
- Windows Vista 32-bit
- Windows Vista 64-bit
- Windows Server 2003 32-bit
- Windows Server 2003 64-bit
- Windows XP 32-bit
- Windows XP 64-bit
- Windows 2000

Windows 7
CERTIFIED FOR Windows Server 2008
CERTIFIED FOR Windows Vista
Designed for Microsoft® Windows Server™ 2003, Windows Server 2003 x64 Editions
Designed for Microsoft® Windows® XP, Windows® XP x64 Edition

Brainboxes PCI Express Drivers have undergone Microsoft testing with the PX RS232 and RS422/485 family. Upon passing these tests, the drivers were signed by Microsoft, as an indication of their quality and stability.

2. Installation Instructions

PLEASE READ CAREFULLY

- **For RS232 Cards**, there are **TWO Installation** steps to installing the Boost.PCIe driver:
    1. CARD driver
    2. PORT driver
- **For RS422/485 Cards**, there are **THREE Installation** steps to installing the Boost.PCIe driver:
    1. CARD driver
    2. PORT driver
    3. BASE SYSTEM DEVICE driver. This is the RS422/485 Controller
- Each step will take you through a full installation using the Found New Hardware wizard.
- Once the Card is installed, the Operating System will detect the COM Port. All you will need to do to install the COM Port is to run through the same installation steps as the Card. This also applies to the RS-422/485 Controller
- Follow the Operating System specific instructions below to start the installation procedure.

If you have any issues with installation, please follow the steps in Section 4: Uninstallation, then attempt to install again. If you still have issues, see Section 6: Troubleshooting and Testing

2.1. Windows XP and Windows Server 2003 Installation

Note: Images below show a PX-260 4 Port RS232 device as an example. The same installation steps can be applied to all other products in the PCI Express range.

1. Turn off the PC (unplug from power socket) and insert the PCI Express Card into a free PCIe slot.

2. Turn the PC on.

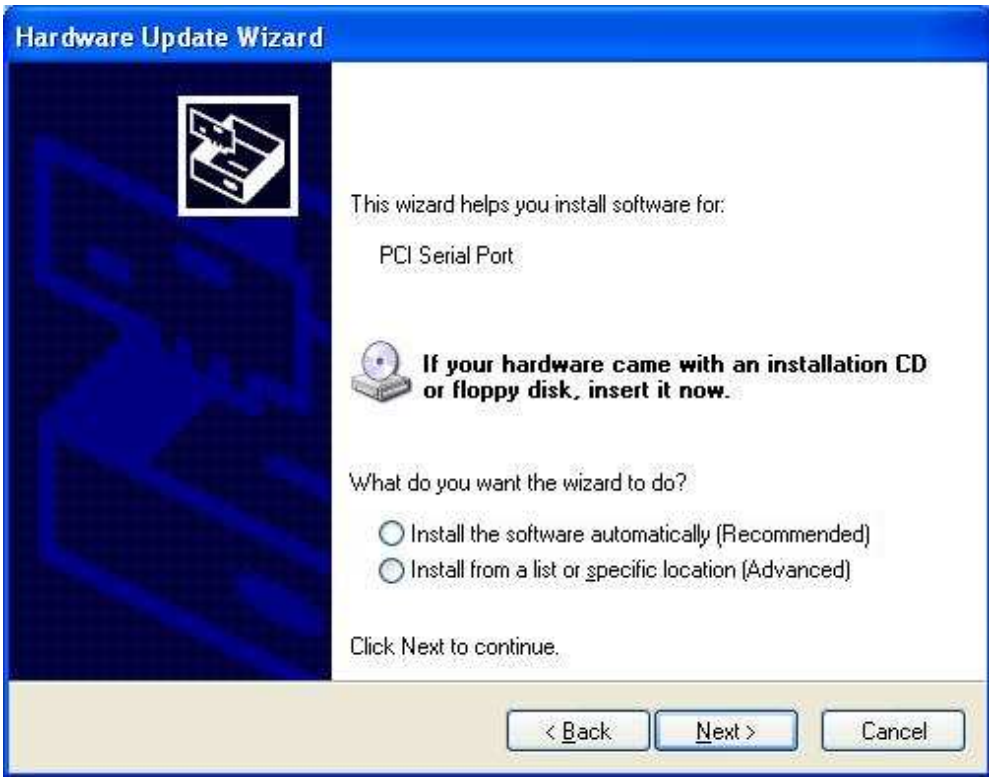
3. Insert the Boost.PCIe CD

4. If you would like to install via Windows Update, select *"Yes, this time only".* Otherwise **Select '***No, not this time***'** to install from the CD and click **next**.

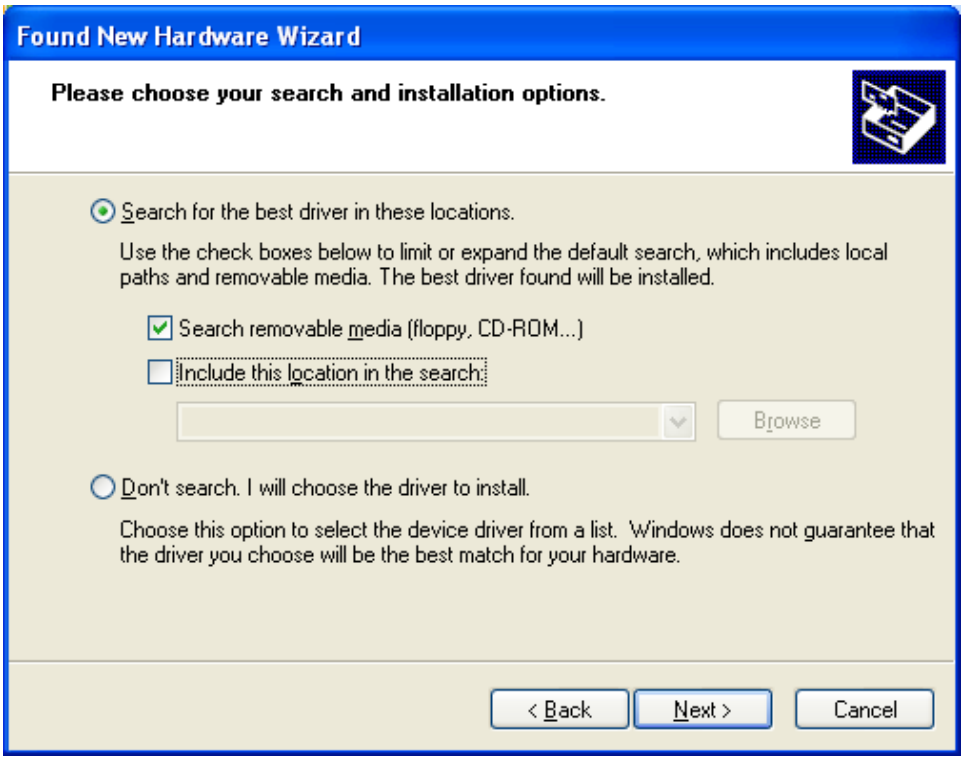
Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

5. The Found New Hardware Wizard will then ask you to locate the software drivers.

   If you have chosen to search Windows Update, select "Install the software automatically (Recommended)". This will take you to Step 7. If you wish to install from the Boost.PCIe CD, select "Install from a list or specific location (Advanced)" and click next to point to the CD drive.


Hardware Update Wizard
This wizard helps you install software for:
PCI Serial Port
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

6. **Select** to '*Search for the best driver in these locations'* and then '*Search removable media',* as shown below. Click **Next**


Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

7. The Installer will copy across all the drivers and associated registry files. Click **Finish** when complete.

Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
Brainboxes PCIe 4 Port RS232 Serial Card (PX-260/701/268)
Click Finish to close the wizard.
< Back
Finish
Cancel

8. **If you are installing a mulitport card, you will need to install each port manually following steps 4-7 when prompted for each port on your card.**

9. **If you are installing a 422/485 card, you will also need to install the "Base System Device". This is the 422/485 Controller for your card. Follow steps 4-7 again when prompted.**

10. Once installed, you can check the COM Number of the Port, by opening Device Manager (See **Section 3.1: Finding your Brainboxes COM port**). If you need to change the COM port number, see **Section 3.2 Changing Your COM Label.**

2.2. Windows Vista & Server 2008 64 & 32 bit Installation

Note: Images below show a PX-260 4 Port RS232 device as an example. The same installation steps can be applied to all other products in the PX PCI Express range.

1. Turn off the PC (unplug from power socket) and insert the PCI Express Card into a free PCIe slot.

2. Turn the PC on.

3. Insert the Boost.PCIe CD

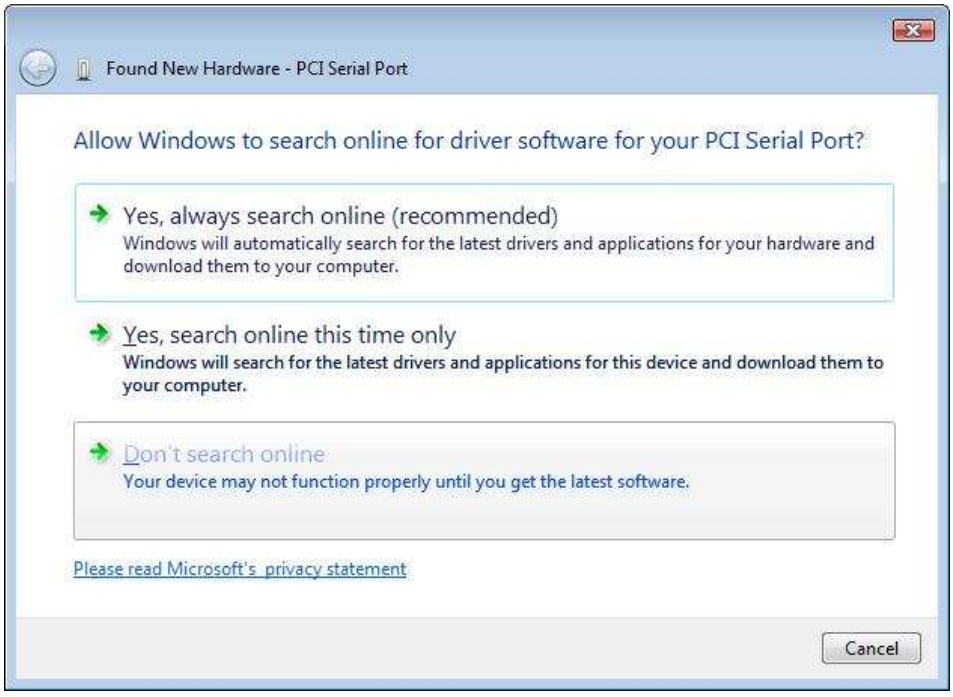
4. The *Found New Hardware Wizard* will come up. If your computer is set to check Windows Update Automatically for a driver, then it could take longer for this screen to pop up.

5. **Select** '*Locate and install driver software'*.

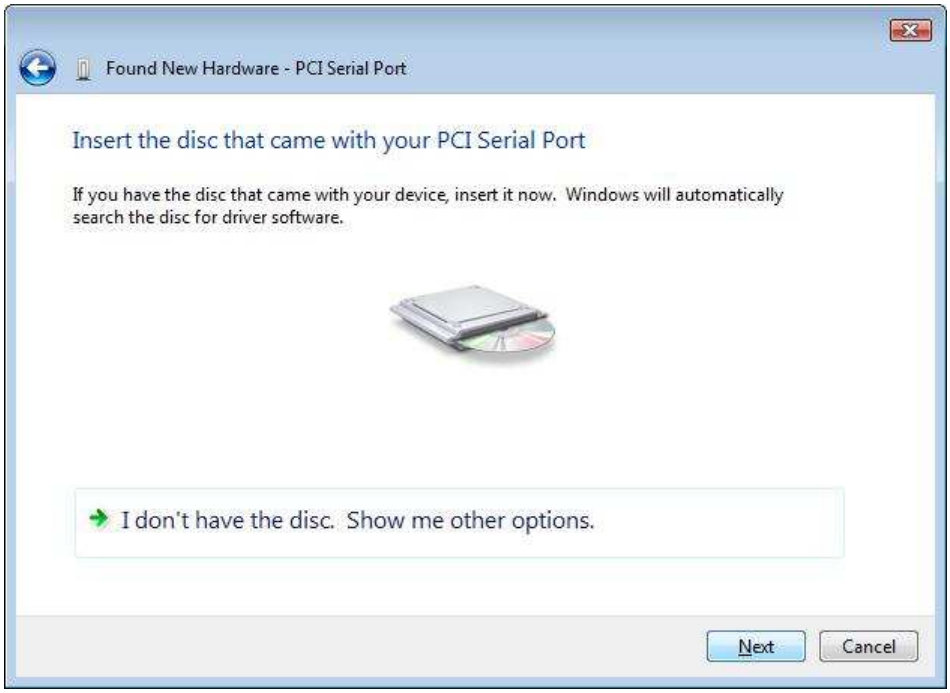
Found New Hardware
Windows needs to install driver software for your PCI Serial Port
Locate and install driver software (recommended)
Windows will guide you through the process of installing driver software for your device.
Ask me again later
Windows will ask again the next time you plug in your device or log on.
Don't show this message again for this device
Your device will not function until you install driver software.
Cancel

6. **NB** Vista will enter the Security Check to ensure that you have initiated the installation (and not some malicious program). Click **Continue**

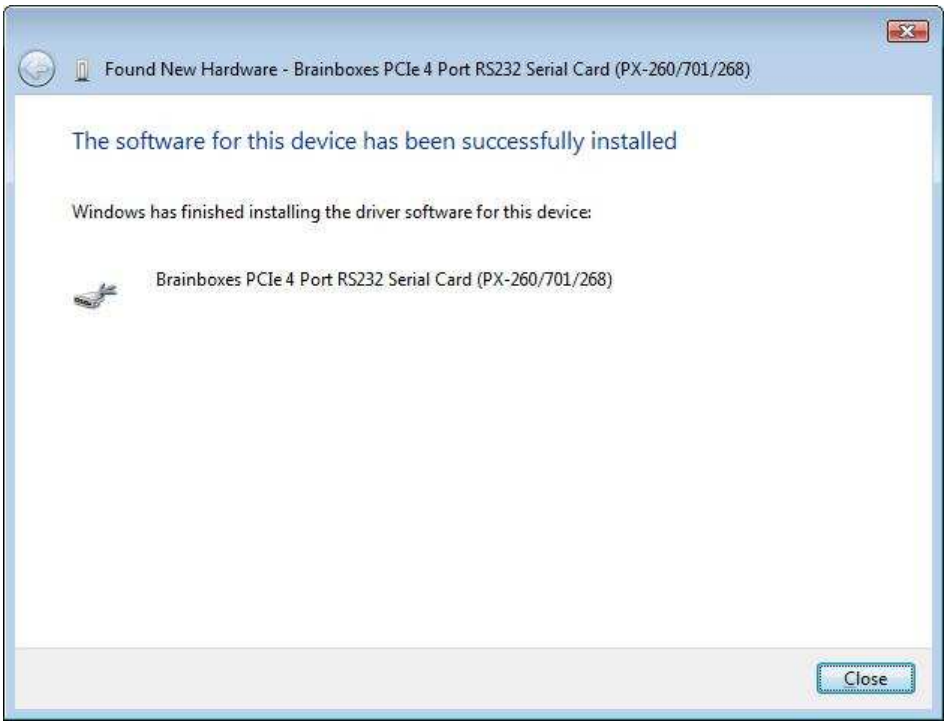
7. If you would like to install via Windows Update, select *"Yes, this time only".* **This will take you to Step 9.** Otherwise select **'***Don't search online***'** to install from the CD.


Found New Hardware - PCI Serial Port
Allow Windows to search online for driver software for your PCI Serial Port?
Yes, always search online (recommended)
Windows will automatically search for the latest drivers and applications for your hardware and download them to your computer.
Yes, search online this time only
Windows will search for the latest drivers and applications for this device and download them to your computer.
Don't search online
Your device may not function properly until you get the latest software.
Please read Microsoft's privacy statement
Cancel

8. The Found New Hardware Wizard will then ask you to locate the software drivers. Ensure that the CD is in the drive and click **Next**


Found New Hardware - PCI Serial Port
Insert the disc that came with your PCI Serial Port
If you have the disc that came with your device, insert it now. Windows will automatically search the disc for driver software.
I don't have the disc. Show me other options.
Next
Cancel

9. Once the driver has been installed, click **Close.**


Found New Hardware - Brainboxes PCIe 4 Port RS232 Serial Card (PX-260/701/268)
The software for this device has been successfully installed
Windows has finished installing the driver software for this device:
Brainboxes PCIe 4 Port RS232 Serial Card (PX-260/701/268)
Close

- **If you are installing a mulitport card, the Operating System will install each subsequent Serial Port automatically.**

- **If you are installing a 422/485 card, you will also need to install the "Base System Device". This is the 422/485 Controller for your card. Follow steps 4-9 again when prompted.**

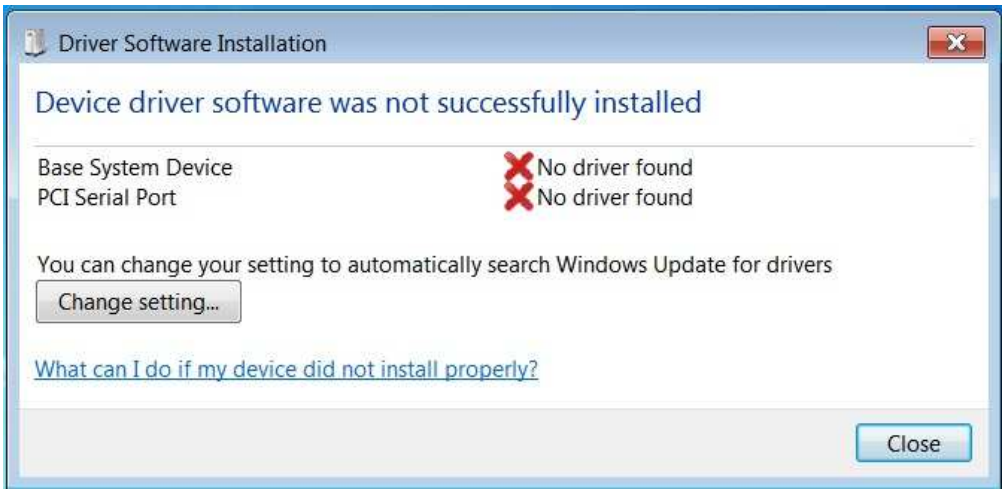
- Once installed, you can check the COM Number of the Port, by opening Device Manager (See **Section 3.1: Finding your Brainboxes COM port**). If you need to change the COM port number, see **Section 3.2 Changing Your COM Label.**

2.3. Windows 7/Server 2008 R2

Note: The following installation instructions use a PX-346, but the installation instructions are the same for any PX card.

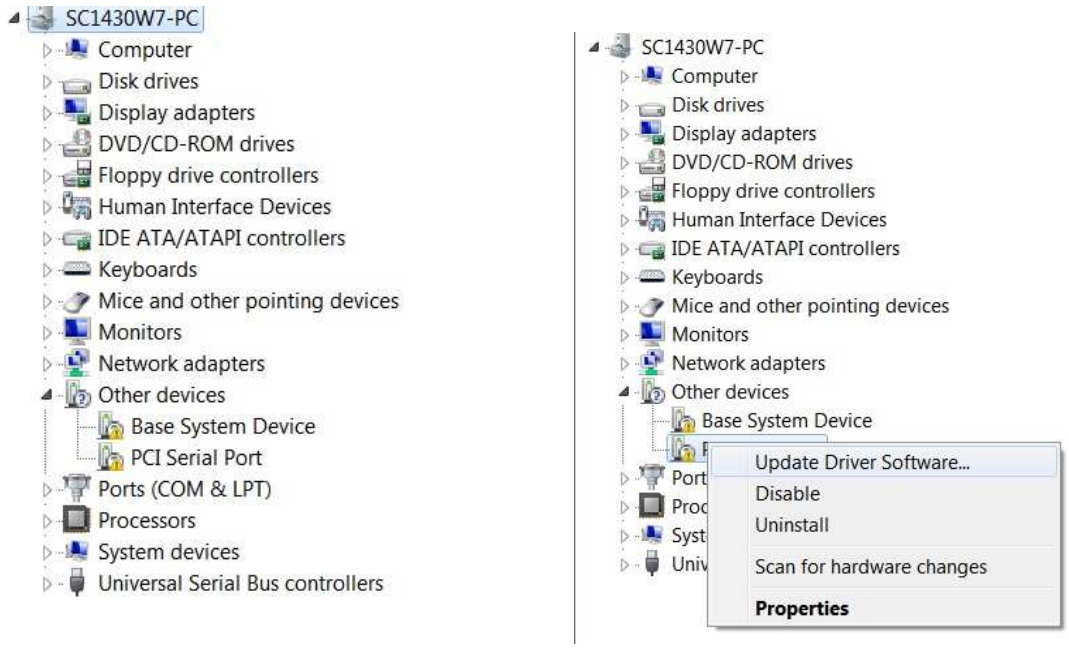
1. When you boot up your computer on Windows 7, Windows update will automatically search for the latest drivers. If you have a connection to the internet, the drivers will be installed and the device will be ready to use.

2. If there is no connection to the internet or the drivers can't be found, a message will appear to tell you that device driver software was not successfully installed.

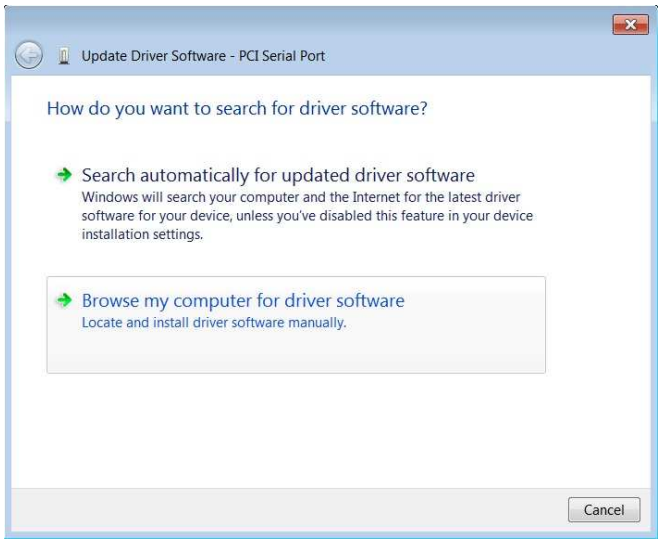

Driver Software Installation
Device driver software was not successfully installed
Base System Device
No driver found
PCI Serial Port
No driver found
You can change your setting to automatically search Windows Update for drivers
Change setting...
What can I do if my device did not install properly?
Close

3. To install the drivers Device manager will need to be opened. To open device manager go to the control panel, system, hardware tab, then click on the device manager button.

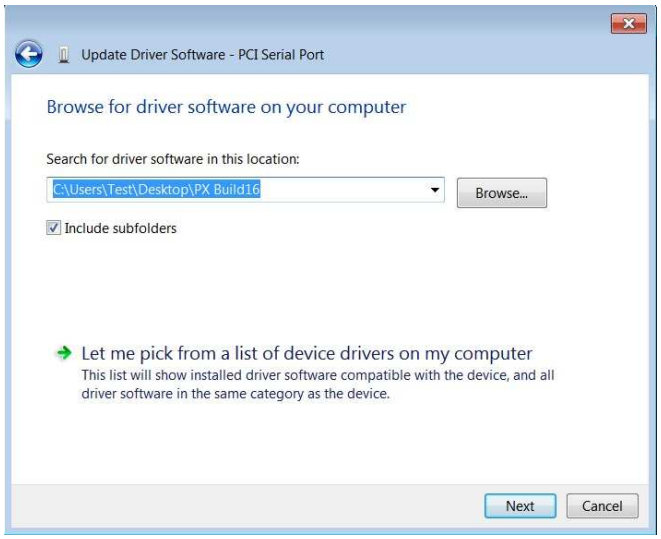
4. Once this is open you will see the yellow ! icon in the other devices node. Right click on the device and click on update driver software.



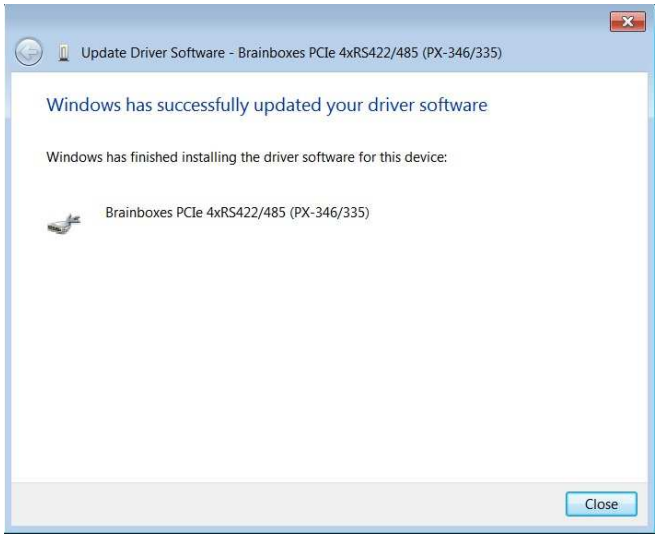
5. If your Brainboxes card came with a CD insert it now and select to search automatically and the driver software will be found and installed. Skip to step If not and you have a folder with the drivers, select to browse your computer for the drivers.


Update Driver Software - PCI Serial Port
How do you want to search for driver software?
Search automatically for updated driver software
Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.
Browse my computer for driver software
Locate and install driver software manually.
Cancel

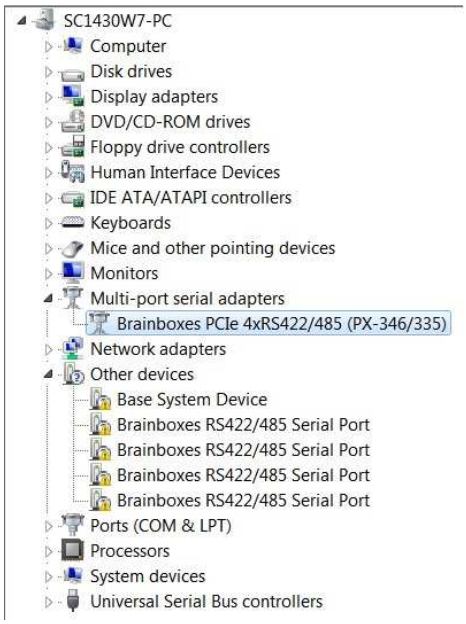
6. Select the folder which contains the drivers that you want to install for your device.


Update Driver Software - PCI Serial Port
Browse for driver software on your computer
Search for driver software in this location:
C:\Users\Test\Desktop\PX Build16
Browse...
Include subfolders
Let me pick from a list of device drivers on my computer
This list will show installed driver software compatible with the device, and all driver software in the same category as the device.
Next
Cancel

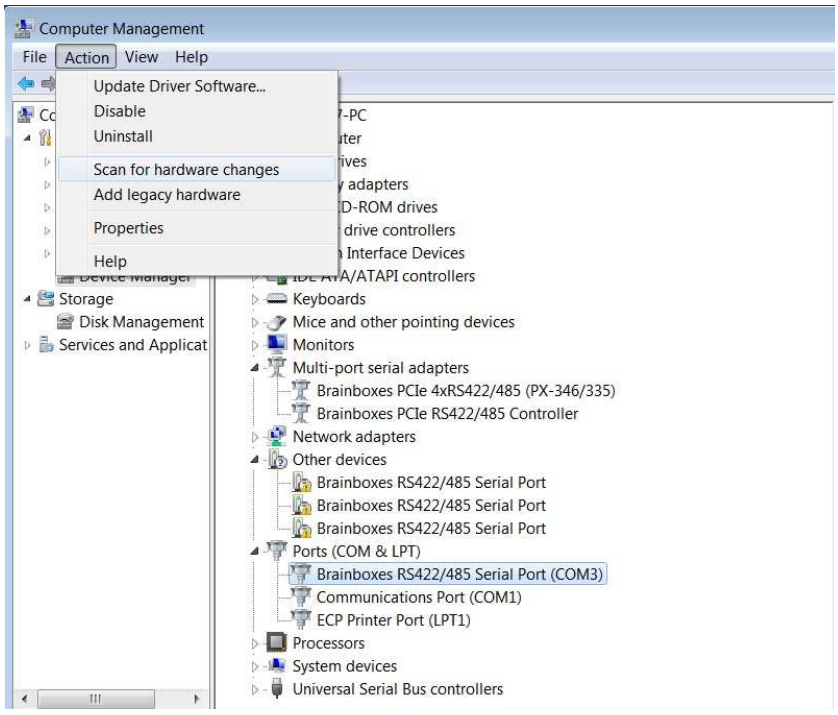
7. The drivers will then be installed for the card.


Update Driver Software - Brainboxes PCIe 4xRS422/485 (PX-346/335)
Windows has successfully updated your driver software
Windows has finished installing the driver software for this device:
Brainboxes PCIe 4xRS422/485 (PX-346/335)
Close

8. You will then need to install the Base System Device (RS422/485 devices only) and then install all of the Serial ports using the same steps as above.



9. Once you have installed one of the ports you can scan for hardware changes and the other Serial Ports will be installed automatically.

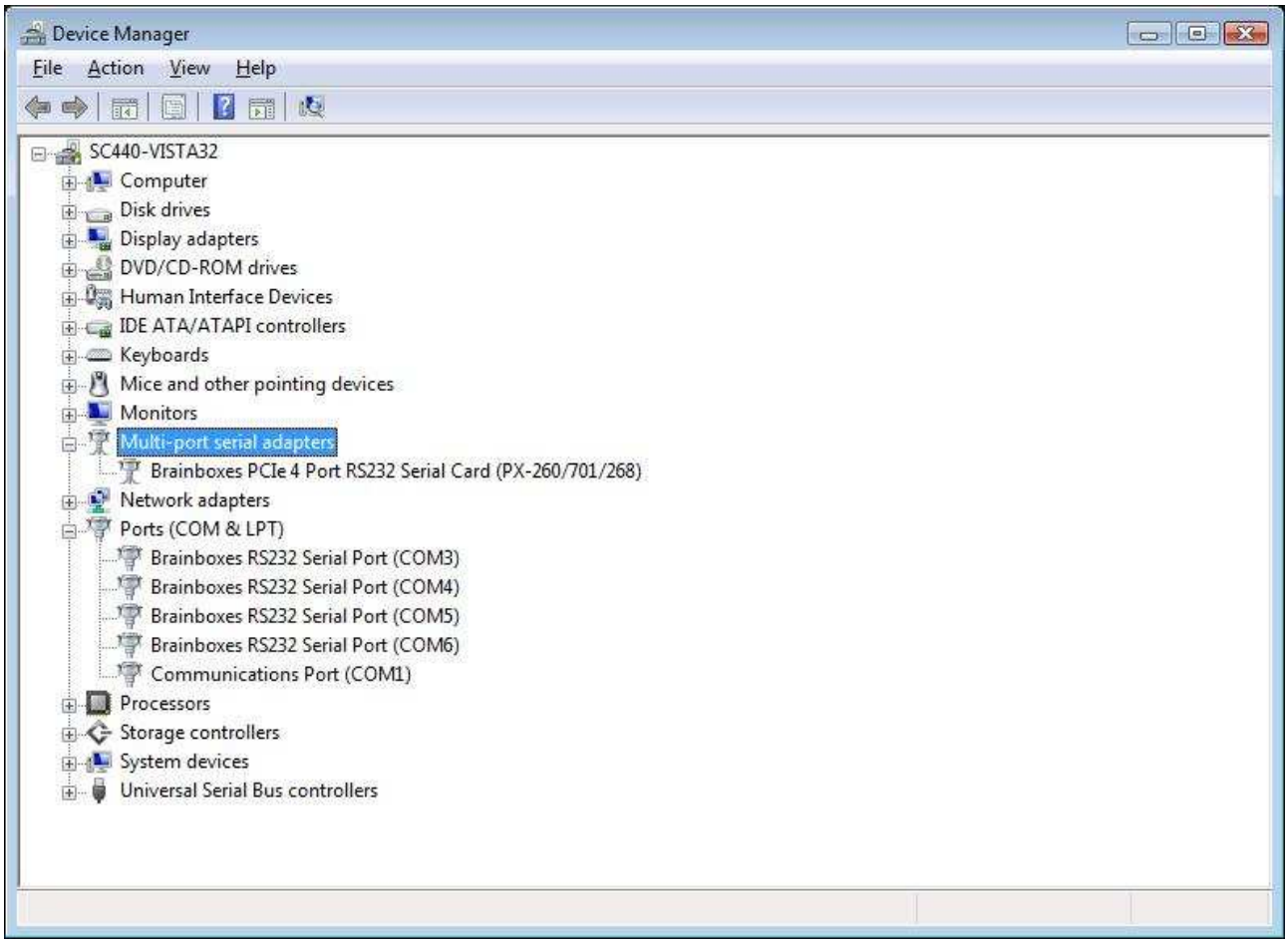


3. Product Configuration

Note: Images below show a PX-260 4 Port RS232 device as an example. The same steps can be applied to all other products in the PX PCI Express range.

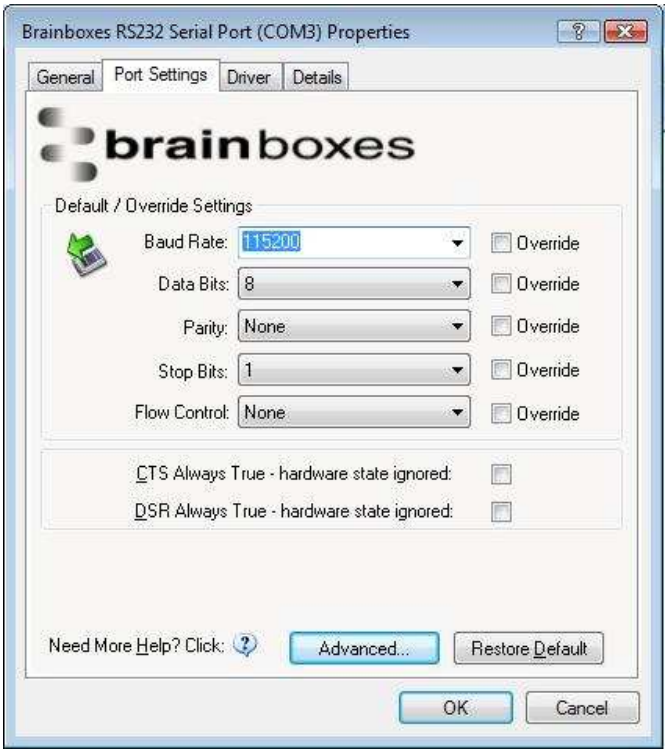
3.1. Finding your Brainboxes COM port.

- **Open** Device Manager (Found by Right Clicking on My Computer and clicking *Manage.* Then Select *Device Manager* from the left hand pane.) For Server 2008 users, Device Manager is found within Diagnostics in Server Manager.
- **Find** the Brainboxes Serial Port entry in Device manager. (Found under the '*Ports*' section)
- The Brainboxes Serial Port entry displays the current COM number in brackets after the name. (This is usually *COM3* following install, but may be different if other serial devices have been installed in the past)
- To change your COM label, see **Section 3.2: Changing your COM label**

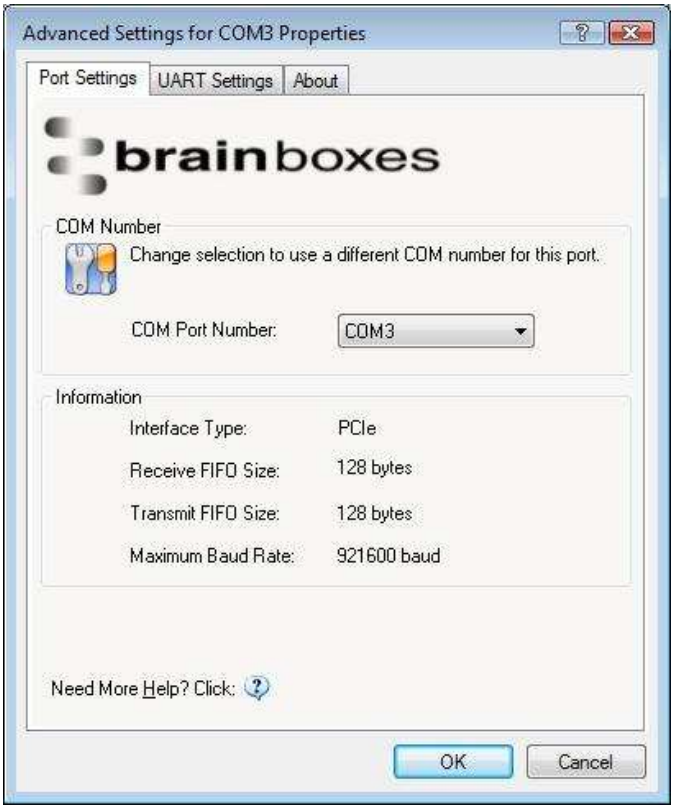


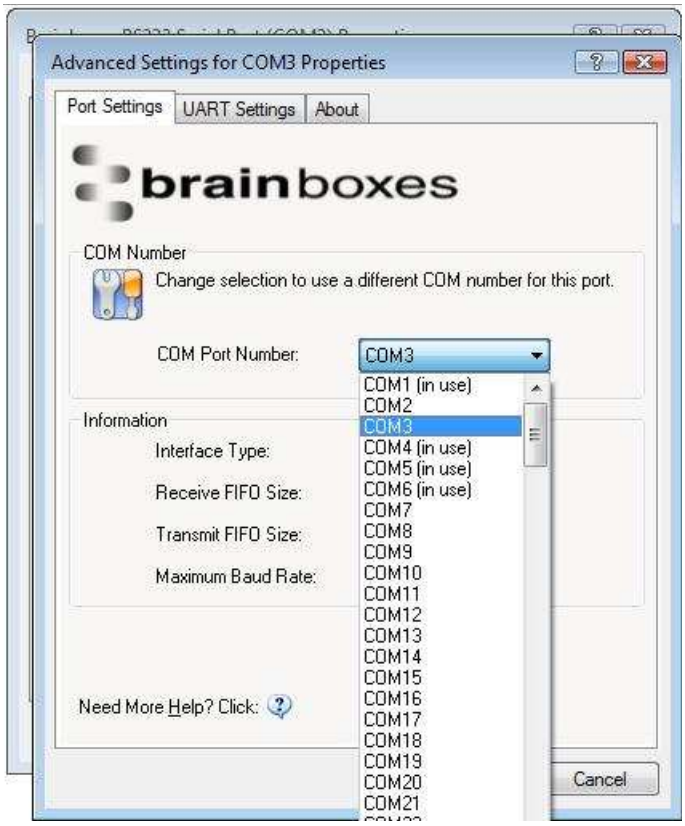
3.2. Changing your COM label

- If you need to change the COM label, **Double click** on the Port entry in Device Manager
- Click on the '*Port Settings*' tab and click **Advanced**



- A new COM Port label can be selected from the "Com Port Number" dropdown menu.



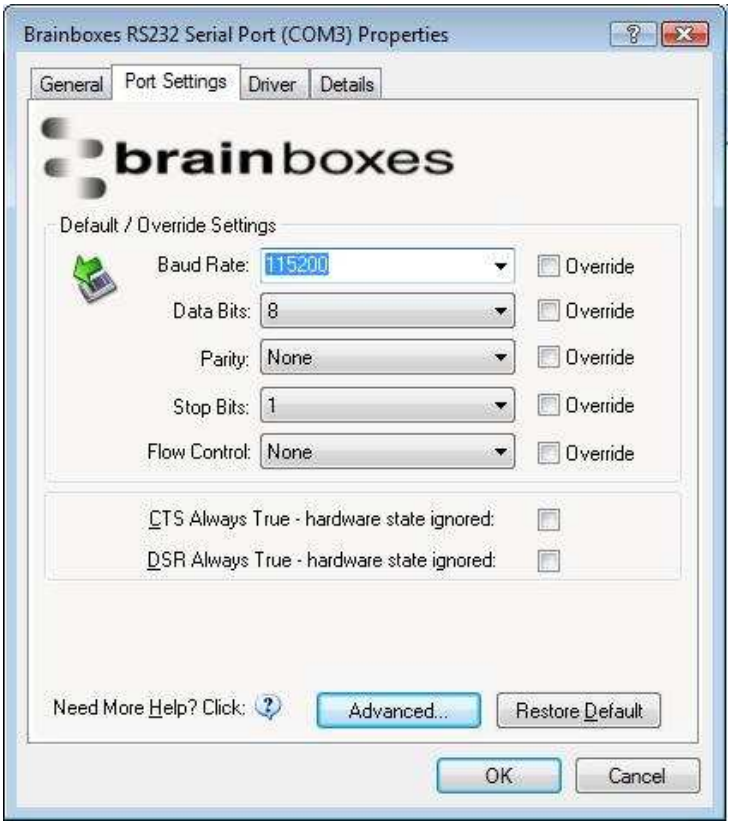


- If the COM Port number is labelled "*in use*", it is either currently used by a COM Port present on the system, or is reserved for a device which is not currently present. It is possible to select this COM number and force the change, if you are sure it is not required by any other device.

3.3. Port Settings

The Port Settings allow you to set Default or Override Settings for the serial communication and how to deal with incoming hardware handshaking events.

- To open '*Port Settings*', open device manager and **Double Click** on the Brainboxes COM Port Entry under the '*Ports*' section
- Then Click on the '*Port Settings*' tab.



- All options can be selected from the Dropdown Menus. In addition, you can enter a non-standard value into the Baud rate

NB – Once the desired settings have been achieved, you must click **OK** to activate them. At anytime click the '*Restore Default*' button to return to the original setup.

Default / Override Settings

- The **"Default Settings"** will be set if an application does not specify the serial settings when it opens the COM Port.
    - This is sometimes the case with old Legacy applications and you will need to choose these settings to match the communications that you wish to use.
    - The majority of Applications will specify what Serial Settings they wish to use. In this case, it will not matter what the Default settings are, as the Port will be opened with the Application's Settings.
- When the **'Override'** box is checked next to the Default Setting, the Port will communicate at this setting whether an application has requested it or not.
    - For example, this will enable you to force baud rates that your application does not allow you to select. This can be useful for interfacing to equipment which uses higher baud rates or unusual baud rates, which your application does not support.
    - In a case where you want to use hardware handshaking, but your application is not capable, you can select RTS / CTS Always True – Hardware state ignored and choose to Override it.
    - **NB** with the use of Override Settings, you need to ensure that the equipment you are connecting to is setup to match the communications settings you are forcing.

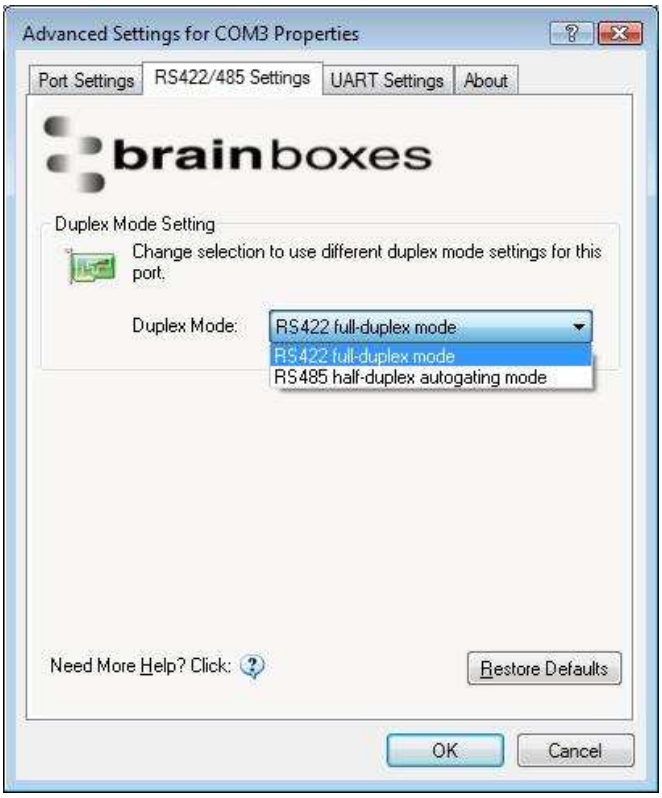
CTS / DSR Always True

- CTS and DSR are incoming hardware handshaking lines. This means they receive signals from the connected device which tell the ExpressCard when it is and isn't OK to send data.
    - Sometimes these signals may want to be ignored. By forcing CTS or DSR True, the ExpressCard will ignore those signals and always send data.

These settings are especially helpful when CTS and DSR are not physically connected (such as in a 3 wire setup) and it is not acceptable for the data flow to stop and start due to arbitrary variances on the unconnected signal lines.

3.4. RS422/485 Settings

For RS422/485 products only, there is an additional tab in the Advanced Settings to allow you to change duplex mode.



- The drop down list allows users to choose the desired RS422/485 operations mode.
- Select “RS422 full duplex mode” for Full Duplex communications.
- Select “RS485 half duplex autogating mode” for Half Duplex communications.
- For further details on wiring, see **Section 8.2: Device Pinout**
- Restore Defaults: Pressing this button will reset all settings on this Property Page back to the factory defaults of this device. The default settings for this Property Page are “RS422 full duplex mode”.

Background Information:

- DTR/DSR Handshaking is not available on 422/485 devices.
- Full Duplex Mode

  This mode is generally used between one transmitter / receiver to only one other transmitter / receiver, but it is possible for each output to drive up to 10 receivers.

  Generally, in RS422 systems, all 8 signal lines from the 9 pin D connector participate in the data transfer sequence. Thus 4 twisted pair cables are used. One twisted pair carries the TXD data outwards, one pair brings the RXD data inward, another pair carries the RTS handshaking signal

outwards, and the fourth pair brings the CTS handshaking signal inwards. There is no need to carry the ground from one device to another.

- Half Duplex Autogating Mode

  The RS485 standard is similar to the RS422 standard upon which it is based. The main difference is that up to 32 transmitter / receiver pairs may be present on the line at one time.

  Although the card uses a 9 pin D connector, generally not all the lines are used for RS485 systems. The RTS+/- and CTS+/- lines, though driven by the card, are usually not connected. In two wire Half-Duplex configuration, the TXD+ line is connected to RXD+, whilst the TXD- line is connected to RXD-. Only one pair of twisted wire cable is used in RS485 Half Duplex communication.

  These are the two main wiring schemes:

  - RS485 One Talker Many Listeners (Half Duplex)
  - RS485 Many Talkers Many Listeners (Half Duplex)

Please see Section 8.2: Device Pinout for wiring diagrams.

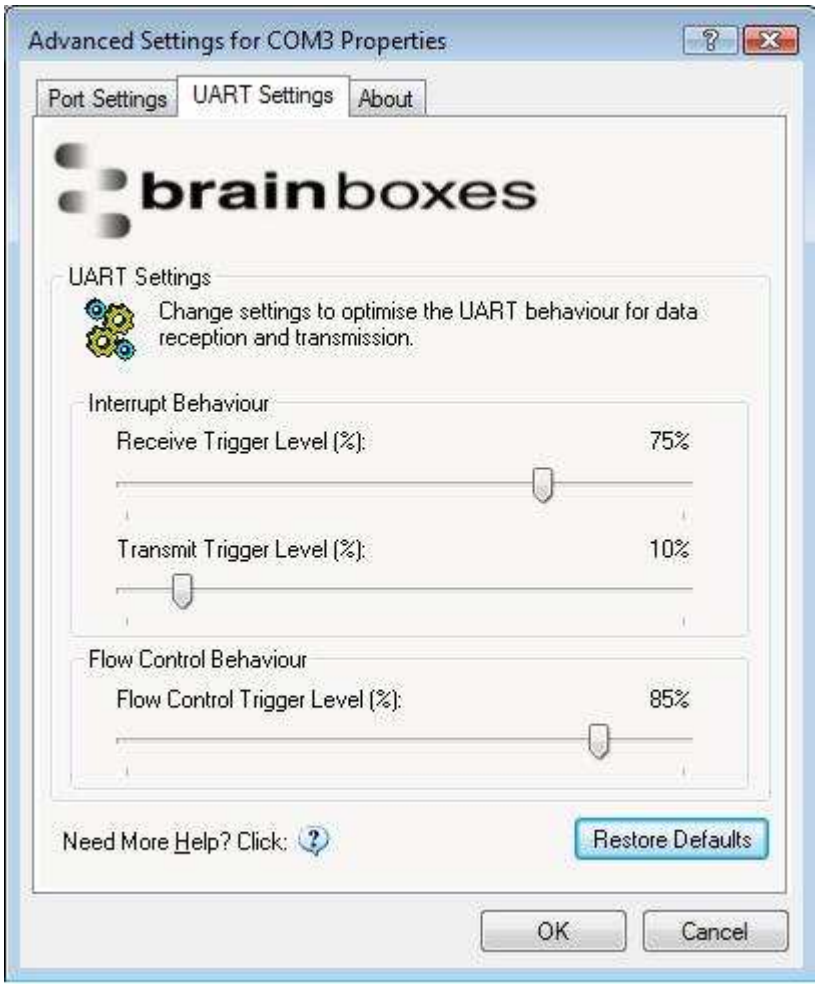
3.5. UART Settings

The UART settings for the Brainboxes COM Port allow you to get the best performance from your device and system. There are two choices, dependant on whether minimal CPU usage or Data Latency (delay) is the main concern.

The default settings have been carefully selected and should provide great performance for the majority of users. The UART Settings will help if you need to lower the CPU usage, or your application is timing critical and requires a lower Data Latency

- To open Advanced Settings, open the Port Settings (as described in section 3.2) and click the **Advanced** button

- **Select** the '*UART Settings*' tab.



Receive Trigger Level:

- This slider allows you to choose how much incoming data is stored in the Receive FIFO before it gets processed by the driver.

- Processing the data takes a small amount of CPU time, so doing this frequently will increase CPU Usage, but it will also decrease the latency at which data is delivered to the application. Choosing the right value is a trade-off between CPU Usage and Latency.

- Setting this value very low will result in a high number of interrupts, and therefore increased CPU Usage, as well as short latency times between the reception of the data by the UART chip and the delivery to the application. Choosing a high value has the opposite effect.

- If the Receive Trigger Level is chosen very high, and data is continuously streaming into the UART's FIFO, then this might result in data getting lost due to a FIFO Overrun. This is caused by the reaction time of the Operating System and driver to the interrupt. If this reaction time is longer than it takes to fill up the remaining space in the FIFO, then overrun can occur. To prevent this, choose a slightly lower Receive Trigger Level, and use Flow Control.

- The slider allows choosing values from 1% to 100% of the Receive FIFO size.

Transmit Trigger Level:

- This slider allows you to choose when the Transmit FIFO is re-filled with data. If a low value is chosen, little or no data is left in the Transmit FIFO at the time of the re-fill. The higher the value, the more data will be in the FIFO.

- Re-filling the Transmit FIFO before it runs empty has the advantage that the small processing time required to generate the interrupt notification to the driver and putting data into the FIFO will not have the effect of a gap appearing in the data stream on the transmission line.

- It is not common to choose high values for this slider, as the potential transmission gap is easily bridged, even if values are chosen in the lower part of the slider. Higher levels increase the amounts of hardware interrupts generated, and hence increase CPU usage.

- The slider allows choosing values from 0% to 100% of the Transmit FIFO size.

Flow Control Trigger Level

- The slider only takes affect if any type of flow control was selected by the application that opened the COM port.

- This slider allows you to choose when the flow control state changes (RTS, DTR, in-band flow control). If the amount of received data reaches the Flow Control Trigger Level, any active flow control mechanism is set to the 'do not send' state. Once the amount of received data falls again below this level, all active flow control mechanisms are returned to the 'send data' state.

- Depending how handshaking is implemented on the device at the other side of the cable, it is possible that some data is still transmitted to our UART even after handshaking has been turned off. Setting very high Flow Control Trigger Levels might in this case result in a FIFO overrun, and hence the loss of data.

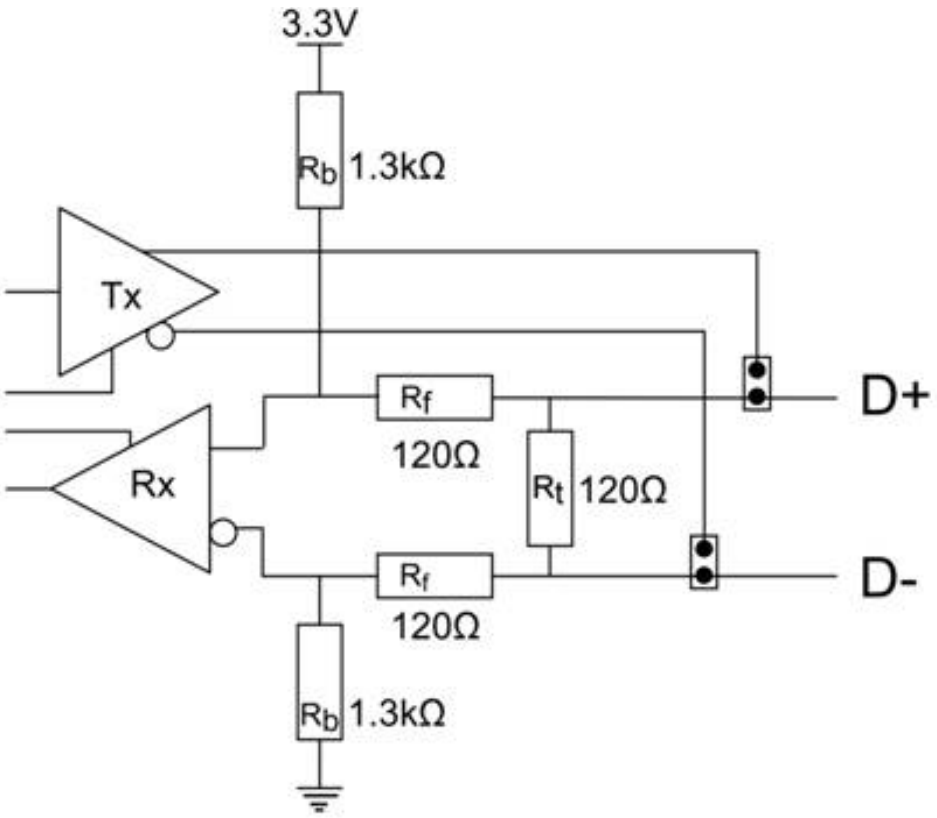
- It is not common to choose low values for this slider, as this increases the amount of handshaking changes on the line. That might increase the processing overhead on the remote device, and result in gaps in the data stream, thus reducing data throughput. Usually values are chosen in the higher part of the slider.

- The slider allows choosing values from 1% to 100% of the Receive FIFO size.

Pressing the “Restore Defaults” button will reset all settings on this Property Page to the factory defaults of this device.

3.6. Termination Resistors

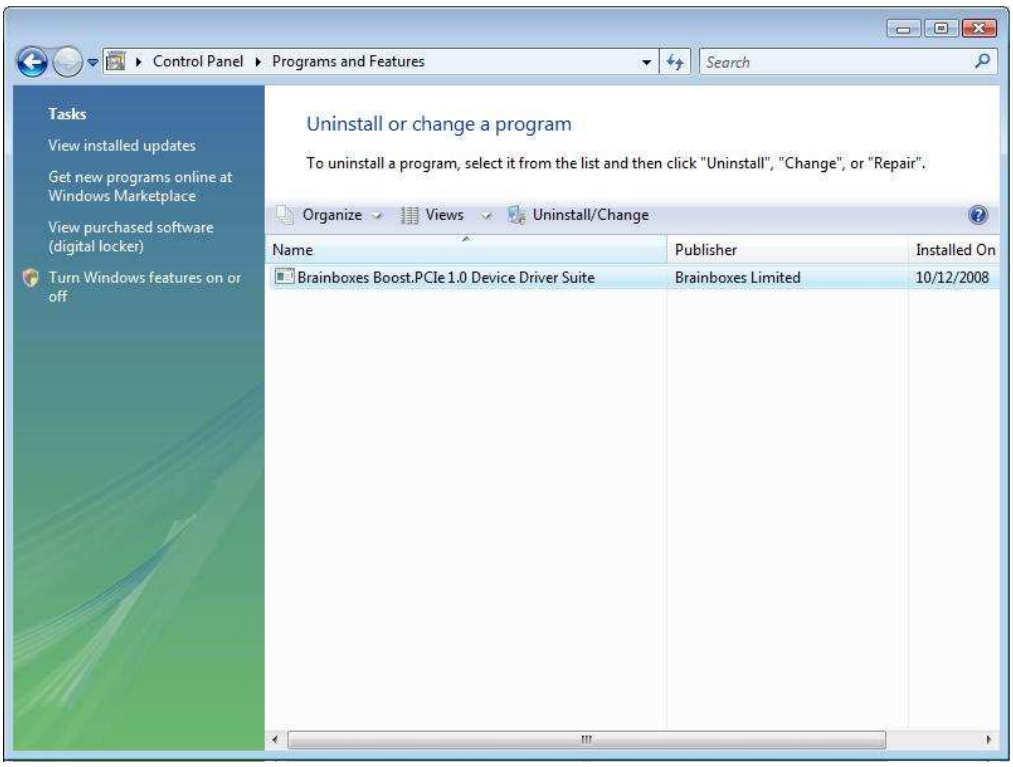
This RS422/485 termination circuit is based on the recommendation of Texas Instruments, and uses resistors to provide line termination R_t, bus-idle failsafing (biasing) R_b and bus-shorted failsafing, R_f. However, this circuit may not be suitable for all RS-485 bus systems. Whilst the circuit includes line termination to prevent the data signal being reflected, this termination should only be present at each end of a bus and not at any intermediate nodes.
Also, while this circuit ensures that our PX cards are properly biased when the bus is idle, this circuit may not provide sufficient bias for any nodes (ie external RS485 devices) which have their receivers connected directly to the D+ and D- lines. If you do have RS485 devices whose receivers are connected directly to the D+ and D- lines, you may need to add a couple of resistors to your bus, from D- to ground and from D+ to a positive supply, with a resistance sufficient to give at least 0.2V between D+ and D- when the bus is idle.



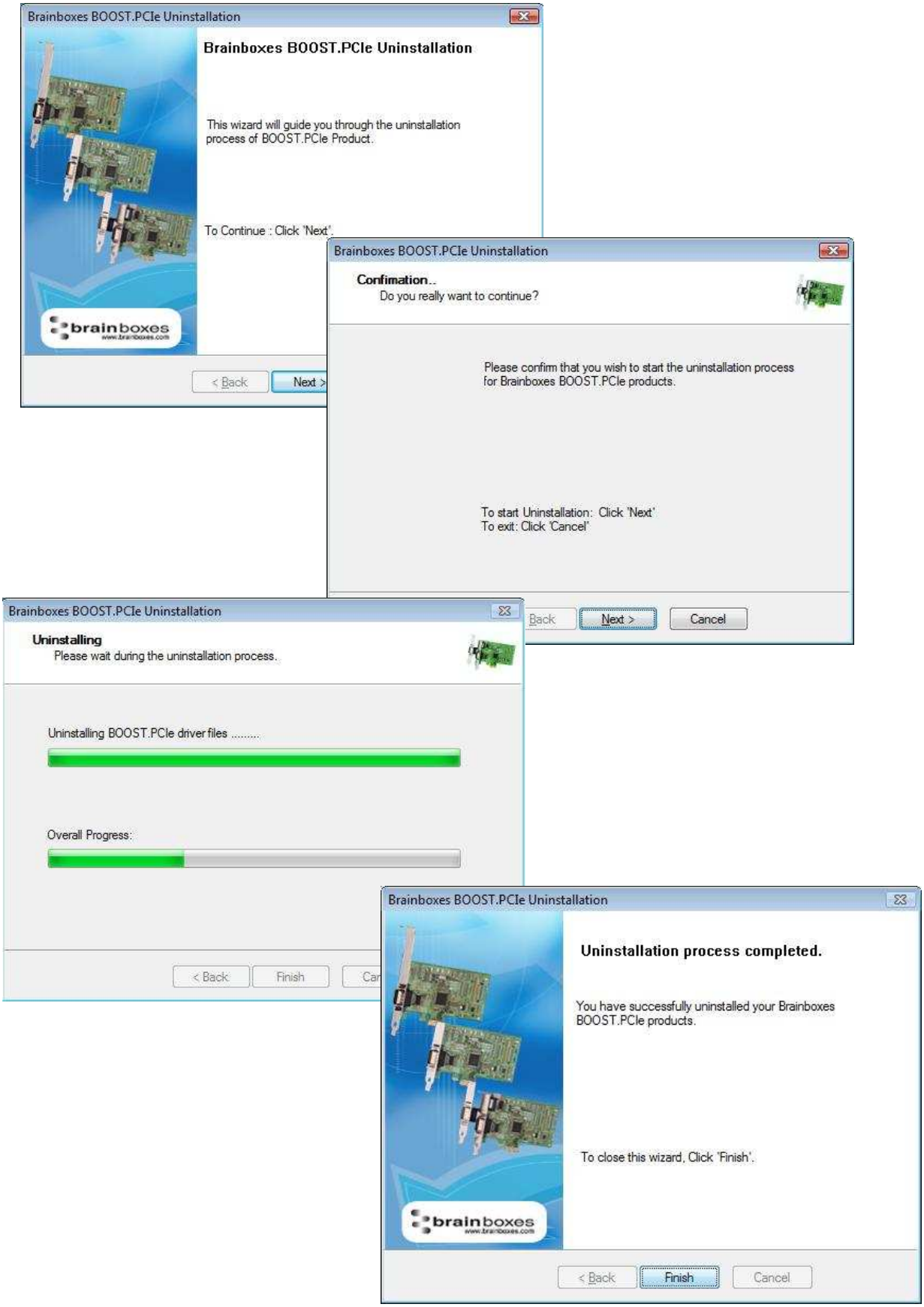
4. Uninstallation – Windows Server 2008/Vista/Server 2003/XP

To uninstall the device, please ensure the PCI Express Card is present on the PC.

- **Open** Control Panel, and then open "*Add or Remove Programs".* In Vista, this will be called *"Programs & Features"*



- The Brainboxes Uninstallation wizard will launch, which will remove all driver files and associated registry entries. Just click **Next** on each page of the Wizard. When the drivers have been uninstalled, click **Finish**.



- Once finished, check Device Manager to ensure all Ports have been removed from the system.
- **You may now power down the PC and unplug your PCI Express Card.**
- To reinstall the software,
    - Simply Right Click the “Ports” entry in Device Manager and select “Scan for Hardware Changes”. Windows should find the ports and launch the Found New Hardware wizard. Follow the installation instructions as in Section 2 to reinstall
    - Alternatively, restart the PC to launch the Found New Hardware Wizard

5. Boost.PCIe Driver Upgrade / Rollback

There are several parts to the Boost.PCIe, driver:

For RS232:

Example

- Card driver: “Brainboxes PCIe 4 Port RS232 Serial Card (PX-260)”
- Port driver: “Brainboxes RS232 Serial Port (COM3)”.

For RS422/485

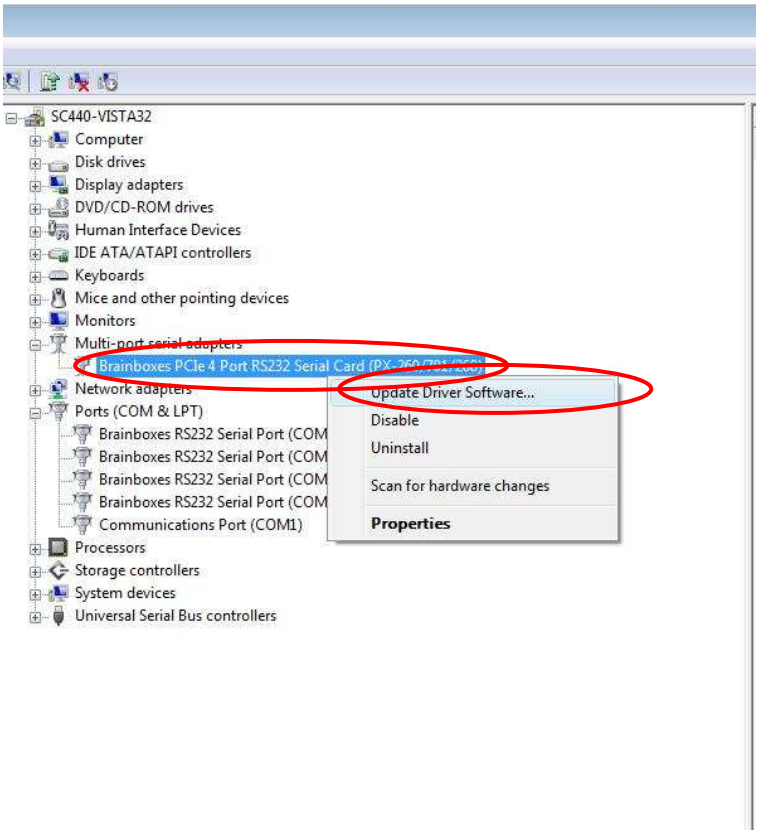
Example

- Card driver: “Brainboxes PCIe 2 Port RS422/485 Serial Card (PX-313)”
- 422/485 driver : “Brainboxes RS422/485 Controller “
- Port driver: “Brainboxes RS422/485 Serial Port (COM3)”.

NB If you need to upgrade or roll back the Boost.PCIe driver, we recommend to completely uninstall the existing drivers first, and then to install the new drivers from fresh. This will restore all settings to factory default. However, if you instead wish to retain your settings, you can use the ‘Update Driver’ or “RollBack” in Device Manager for upgrading/rolling back the Boost.PCIe driver.

5.1. Upgrading the Boost.PCIe Driver

i. Go to Device Manager and Right Click on the Serial Card entry (Found under Multiport Serial Adapters – see image below)



ii. Select Upgrade Driver. This will launch the Found New Hardware Wizard. Follow the on screen instructions and point to the location of the new driver package.

NB: It is only possible to upgrade the Boost.PCIe driver via the Serial Card entry in Device Manager and not the Serial Port entry. The upgrade process will automatically upgrade the Port driver.

6. Troubleshooting and Testing

6.1. Installation problems

- Check the PCI Express Card is correctly installed, and the Ports appear in Device Manager without any errors (Errors are indicted by a yellow exclamation mark)
- If the installation did not complete or shows any error messages then restart the computer.
- If Device Manager is still showing error messages, it is wise to uninstall and re-install. This should cure issues such as Resource Conflicts or failed installations. See **Section 5: Uninstallation and Section 2: Installation Instructions.**
- If the problem is still present after trying the above, try the following to help narrow down the problem.
    1. A different PCIe Slot
    2. A different PC
- Should the problem still persist, please contact Brainboxes Technical Support

6.2. Communication Problems

If you are experiencing communication problems:

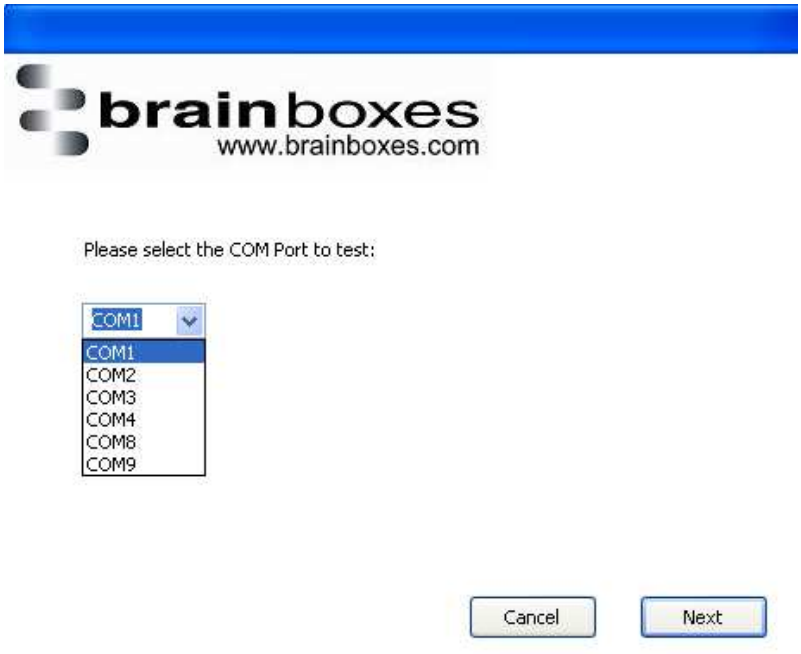
- Check the PCI Express Card is correctly installed, and the Ports appear in Device Manager without any errors (Errors are indicted by a yellow exclamation mark). If there are any errors follow **Section 6.1.**
- Perform a loopback: A loopback test will verify that your card is able to Transmit and Receive Data. The Transmit and Receive lines will need to be connected so that any data sent out of the card is then received back on the same Port. Please use the following to help perform a loopback
    - Brainboxes SerialTest Application: Click here to Launch Loopback test application
    - HyperTerminal application: Testing Serial Cards with HyperTerminal procedure
- Please contact Brainboxes Technical Support with your Loopback test result should the problem still persist with your application.

6.3. Testing your Serial COM port

To test your Brainboxes COM port works correctly you can use the Serial Test application. It is a simple application which will guide you through the steps to check that your Brainboxes COM port is working correctly.

You will need to select the COM port you want to test, and connect a loopback connector to transmit and receive pins of the respected COM port. You will then be given a result as to whether the test has passed or failed.

brainboxes
www.brainboxes.com
Welcome to the Brainboxes Serial Port Test Application.
This test application will perform tests on your hardware after a successful installation. Before the test begins, please check in Device Manager for any visible error messages. If your card wasn't installed properly, please refer to the FAQ document to perform a successful installation, or contact Brainboxes for technical support.
Please refer to the FAQ document for any further help.
Cancel
Next



7. Lifetime Warranty and Support

To receive the lifetime Warranty, you need to register your product with us using our online form.

NB: this must be done within 28 days of Purchase.

Lifetime Warranty Sign up

* Terms and Conditions are available online. Standard warranty period is 3 years if a product is not registered.

Since 1983, Brainboxes have designed, tested and manufactured our products all under one Roof. One of our greatest strengths is in after sales service. Technical Support is provided by members of our Test Team, who know our products inside out and have direct access to the chip and board designers as well as the technicians who built and tested your product.

If you have any issues, questions or suggestions about our Products and Services, then please contact us.

Technical Support is free*. As long as you have a Brainboxes Product we will be happy to help, even if it's discontinued or out of warranty. Excellent Customer Service, just as it should be.

For the quickest solution to your issue, if you email us, please include as much detail of your setup and the fault you are experiencing.

* Standard rate call charges for phone support apply.

Email

Technical Support: support@brainboxes.com

Sales Enquiries: sales@brainboxes.com

Telephone

You can speak to Brainboxes Support or Sales teams direct,

Monday – Friday, 9am to 5pm (UK time)

Tel: +44 (0)151 220 2500

8. Technical Specifications

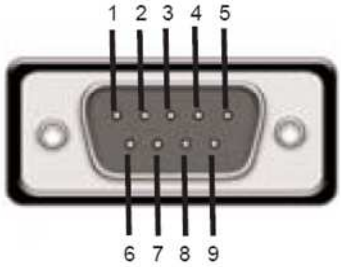
8.1. Supported Serial Settings

Serial Setting	
Baud Rate	Up to 921,600
Data Bits	5,6,7 or 8
Parity	None, Odd, Even, Mark & Space
Stop Bits	1, 1.5 or 2
Handshaking	RTS/CTS DTR/DSR Xon/Xoff
Break	Supported

8.2. Device Pin-out

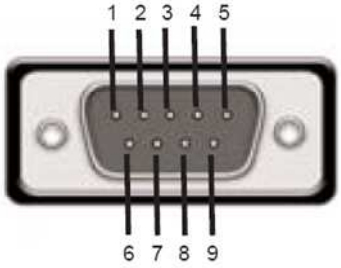
8.2.1. RS232 Devices

Pin 1	:	DCD
Pin 2	:	RXD
Pin 3	:	TXD
Pin 4	:	DTR
Pin 5	:	GND
Pin 6	:	DSR
Pin 7	:	RTS
Pin 8	:	CTS
Pin 9	:	RI



8.2.2. RS422/485 Devices

Pin 1	:	TXD-
Pin 2	:	TXD+
Pin 3	:	RTS-
Pin 4	:	RTS+
Pin 5	:	GND
Pin 6	:	RXD-
Pin 7	:	RXD+
Pin 8	:	CTS-
Pin 9	:	CTS+



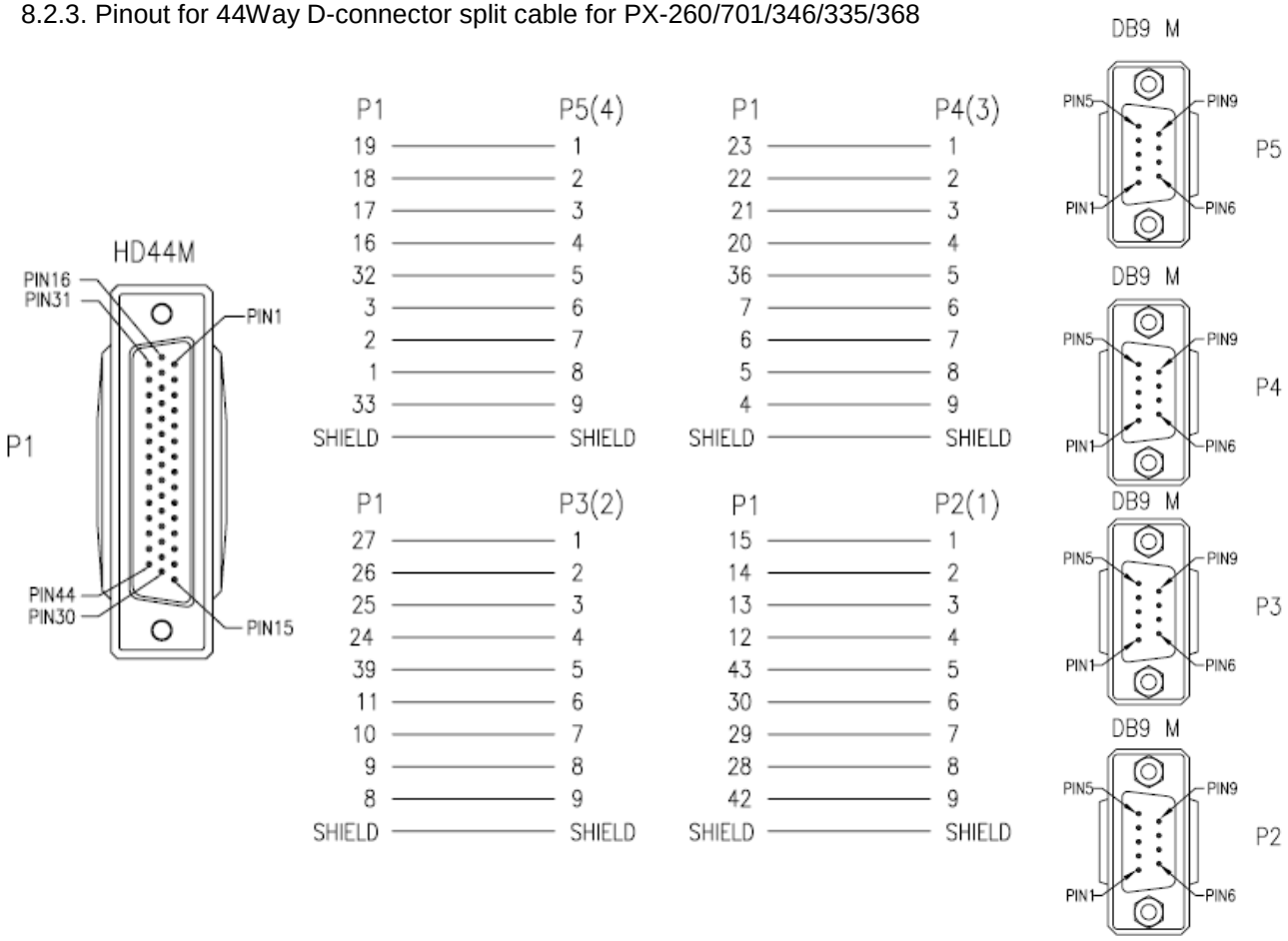
PLEASE NOTE:

- DTR/DSR Handshaking is not available on RS422/485 devices
- For **RS422 FULL Duplex** Communications, please note the pin outs above.
- To achieve **RS485 Half Duplex** Communications, using two wires for communication, Pins 1 and 6, 2 and 7 must be physically shorted.
- Once your wiring is setup, you will also need to set the card to FULL or HALF Duplex mode in the software. For further details, see **Section 3.4: RS422/485 Settings**

Regulatory Approvals / Compliance

For up to date details of global certifications, please check the product datasheet on the Brainboxes website.

8.2.3. Pinout for 44Way D-connector split cable for PX-260/701/346/335/368



8.3. Company Accreditation

Brainboxes achieved accreditation to the ISO14001 environmental standard early 2008. This globally recognised standard ensures Brainboxes can demonstrate effective management of all its environmental impacts, together with a process of continuous improvement.

Brainboxes have also been an ISO9001 registered company since 1994. This has ensured that Brainboxes products, right from design to manufacture, have been produced to the highest standards. We operate this Quality Management System through out the company, and it is subject to regular external surveillance visits.

Brainboxes have always been aware of the need to continually review company processes and has been working with National Quality Assurance (www.nqa.com) since 1994, helping the company to create and maintain internationally recognised accreditation standards.

Linked with our Lean and Six Sigma techniques, we believe we have the most reliable products on the market, and to back this up we are offering a Lifetime Warranty* on all our Serial Products.

8.4. Europe – EU Declaration of Conformity

The PX PCIe Card devices conform to the protection requirements of European Council Directive **2004/108/EC**

The products are designed to meet the standards detailed below. The Declaration of Conformity and supporting Technical Construction File is available by request from Brainboxes.

EN 55022:1998 A2:2003 Class A	Information technology equipment — Radio disturbance characteristics — Limits and methods of measurement
EN 55024:1998 A2:2003 Class A	Information technology equipment — Immunity characteristics — Limits and methods of measurement

8.5. WEEE Directive (Waste Electrical and Electronic Equipment)

The WEEE Directive 2004/96/EC came into force, in the UK, at the beginning of 2007.

Customer Responsibilities

You are encouraged to dispose of WEEE in an environmentally friendly way.

This can be done through your local civic amenities site, an approved treatment facility or alternatively through a relevant compliance scheme.

Brainboxes' Responsibilities

Brainboxes has a legal responsibility, as producer, to provide a free of charge collection service to our customers for our obligated WEEE.

Brainboxes is defined as a producer under the WEEE Regulations because we sell own brand Electrical & Electronic Equipment (EEE) in the UK. Our WEEE **Producer Registration Number is WEE/AH0004XR**. For more information, **click here**.

For details of our WEEE recovery service options, please see our Website, or email us at: weeerecovery@brainboxes.com

8.6. RoHS Compliance

All Brainboxes Serial and Bluetooth products are fully RoHS compliant.

Brainboxes identified at an early stage the importance of rapid compliance to RoHS guidelines and established a project team to actively manage the transition. The initial step in the process was to use our close relationships with suppliers to ensure early access to RoHS compliant components for all of our Bluetooth and Serial Products. In addition, the project team worked to ensure that our manufacturing processes meet all RoHS requirements well in advance of the deadline.

To verify supplier declarations on RoHS compliancy, we have also sent fully built products to an external test house for X-Ray Fluoresence testing on components, using the Fischerscope X Ray system XDAL. This technique is capable of determining percentages of different elements and is accurate to 0.1% Wt.

RoHS Compliant Brainboxes products have been available since January 2005.

What is the RoHS Directive?

The RoHS directive (2002/95/EC the Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment) prohibits the sale of electrical and electronic equipment containing hazardous substances. A list of these hazardous substances includes lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls and polybrominated diphenylethers. RoHS affects each and every electronics manufacturer, directly or indirectly, regardless of geographical location or the equipment they produce.

9. Copyright

Copyright © 1985-2010 Brainboxes Ltd

All rights reserved. No part of this hardware, circuitry or manual may be duplicated, copied, transmitted or reproduced in any way without the prior consent of the Manufacturer

10. Version History

Version	Date	Author	Checked By	Comments
2.0	15/12/08	AH		Manual for first release of Brainboxes fully fledged PCI Express serial drivers.
2.2	11/02/10	BH		Added Windows 7 and Terminating resistors information.